

PROCEEDINGS  
OF  
THE ROYAL SOCIETY.

1842.

No. 53.

March 17, 1842.

SIR JOHN WILLIAM LUBBOCK, Bart., V.P. and Treas.,  
in the Chair.

The reading of a paper, entitled "Contributions to the Chemical History of the Compounds of Palladium and Platinum." By Robert Kane, M.D., M.R.I.A., communicated by Francis Baily, Esq., V.P.R.S., was resumed and concluded.

The author states it to be his object, in this and in some subsequent papers, to examine specially the composition and properties of the compounds of palladium, platinum, and gold; and to ascertain how far they agree, and in what they differ, as to the laws of combination to which these compounds are subjected. He commences with the investigation of the compounds of palladium, employing for that purpose a portion of that metal with which he was furnished by the Royal Society out of the quantity bequeathed to the Society by the late Dr. Wollaston. He describes the mode of obtaining the protoxide of palladium, and enters into the analysis of the hydrated oxide, the black suboxide, and the true basic carbonate of that metal; detailing their properties and the formulæ which express their mode of composition. The chlorides of palladium form the next subject of inquiry; and the author concludes from his experiments that the loss of chlorine which the protochloride undergoes, when kept for some time in a state of fusion at a red heat, is perfectly definite; and also that the loss represents one half of the chlorine which the salt contains. But in the double salts formed by the protochloride of palladium with the chlorides of the alkaline metals, he finds that the similarity of constitution usually occurring between the compounds of ammonium and potassium is violated. From his analysis of the oxychloride of palladium the author concludes that it is quite analogous to the ordinary oxychloride of copper. He then examines a variety of products derived from the action of a solution of caustic potash on solutions of ammonia-chlorides of potassium. Their properties he finds to indicate analogies between palladium and other metals, whose laws of combination are better known. The sulphate, the ammonia-sulphates, the nitrates, and the ammonia-ni-

trates of palladium, and lastly, the double oxalate of palladium and ammonium, are, in like manner, subjected to examination in a detailed series of experiments.

The second section of the paper relates to the compounds of platinum, and comprehends researches on the composition of the protochloride of platinum; on the action of ammonia on biniodide of platinum; and on the action of ammonia on the perchloride of platinum; in which the properties of these substances are detailed and the formulæ expressing their composition deduced.

There was also read, "Magnetic Observations made at Prague for September 1841." By C. Kreil. Communicated by S. Hunter Christie, Esq., M.A., Sec. R.S.

Pursuant to the Notice given from the Chair at the last meeting, a ballot was taken on the question proposed to the Society by the Council, that Mr. William John Bankes, F.R.S., be ejected from the Society: which was decided in the affirmative, and his name was accordingly erased from the Charter-book by the Vice-President in the Chair.

The Society then adjourned over the Easter Recess, to meet again on the 7th of April next.

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April 7, 1842.

WILLIAM THOMAS BRANDE, Esq., V.P. in the Chair.

The following papers were read, viz.—

Meteorological Observations, taken in conformity with the Report drawn up by the Committee of Physics, including Meteorology, for the guidance of the Antarctic Expedition, as also for the fixed Magnetic Observatories, transmitted to the Society by the Lords Commissioners of the Admiralty and the Master-General of the Ordnance, and communicated by the Council, were read; viz.—

1. "Meteorological Observations taken on board H.M. Ship Erebus, for August and September 1841." By Capt. James Clark Ross, R.N., F.R.S., Commander of the Expedition. (*Forms 1 and 2.*)
2. "Meteorological Observations taken by the Niger Expedition, for May, June and July 1841."
3. "Meteorological Observations taken at the Magnetic Observatory, Ross-Bank, Van Diemen's Land, for November and December 1840, and January, February and March 1841." (*Forms 1 and 2.*)
4. "Meteorological Observations taken at the Magnetic Observatory, Cape of Good Hope, for October and November 1841." By F. Eardley Wilmot, Esq., Lieut. in the Royal Artillery. (*Forms 1 and 2.*)
5. "Meteorological Observations taken at the Magnetic Observatory, Toronto, for January, February, March, April and May 1841."

By C. W. Younghusband, Esq., Lieut. in the Royal Artillery. (*Forms 1 and 2.*)

6. "Of the ultimate distribution of the Air-passages, and of the modes of formation of the Air-cells of the Lungs." By William Addison, Esq., F.L.S., Surgeon, Great Malvern. Communicated by R. B. Todd, M.D., F.R.S.

After reciting the various opinions which have prevailed among anatomists regarding the manner in which the bronchial tubes terminate, whether, as some suppose, by cells having free communication with one another, or, as others maintain, by distinct and separate cells having no such intercommunication, the author states that having been engaged in investigating, with the aid of the microscope, the seat and nature of pulmonary tubercles, he could never discover, in the course of his inquiry, any tubes ending in a *cul-de-sac*; but, on the contrary, always saw, in every section that he made, air-cells communicating with each other. He concludes from his experiments and observations, that the bronchial tubes, after dividing dichotomously into a multitude of minute branches, which pursue their course in the cellular interstices of the lobules, terminate, in their interior, in branched air-passages, and in air-cells which freely communicate with one another, and have a closed termination at the boundary of the lobule. The apertures by which these air-cells open into one another are termed by the author *lobular passages*: but he states that the air-cells have not an indiscriminate or general intercommunication throughout the interior of a lobule, and that no anastomoses occur between the interlobular ramifications of the bronchiæ themselves; each branch pursuing its own independent course to its termination in a closed extremity. Several drawings of the microscopical appearances of injected portions of the lungs accompany this paper.

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April 14, 1842.

FRANCIS BAILY, Esq., V.P., in the Chair.

The Rev. Henry Christmas, M.A., was balloted for and duly elected into the Society.

A paper was read, entitled, "Remarks on the probable natural causes of the Epidemic Influenza as experienced at Hull in the year 1833; with a delineation of the Curves of the maximum, the mean, and the minimum Temperatures in the shade, and the maximum Temperature in the sun's rays at Hull, during the years 1823 and 1833." By G. H. Fielding, M.D. Communicated by the Rev. Wm. Buckland, D.D., F.R.S.

The meteorological causes to which the author ascribes the sudden accession of the influenza at Hull, and its continuance from the 26th of April to the 28th of May 1833, are, first, the unusually cold



weather during March, and also the cold and wet which prevailed during April in the same year: secondly, the sudden rise of temperature, amounting to  $21^{\circ}$  of Fahr., which occurred in a few hours on the 26th of April: and thirdly, the continuance, through May, of extreme vicissitudes of temperature between the day and the night; the burning heat of the days and the cold thick fogs, with easterly winds, commencing generally about sunset, and prevailing during the night.

A paper was also read, entitled, "Report of a remarkable appearance of the Aurora Borealis below the Clouds." By the Rev. James Farquharson, LL.D., F.R.S., Minister of Alford.

The phenomenon recorded in this paper occurred on the night of the 24th of February 1842, when a remarkable aurora borealis was seen by the author apparently situated between himself and lofty stratus clouds, which extended in long parallel belts with narrow intervals of clear sky in a direction from north-west to south-east. The author gives, in detail, the particulars of his observations.

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April 21, 1842.

WILLIAM THOMAS BRANDE, Esq., V.P., in the Chair.

The following papers were read:—

1. "On the Organic Tissues in the bony structure of the *Coralidæ*." By J. S. Bowerbank, Esq. Communicated by Thomas Bell, Esq., F.R.S., was in part read.

"Papers from the several Magnetic Observatories established in India, addressed to the Secretary of the Royal Society, by direction of the Honourable East India Company." Communicated by P. M. Roget, M.D., Sec. R.S.

1. From the Magnetic Observatory at Madras:—

Magnetic and Meteorological Observations for October, November and December 1841; as also for January 1842.

Term-day Observations for October and November, and Curves for August, September, October and November 1841.

Observations of the Direction and Force of the Wind, and the state of the Sky, during October and November 1841.

Extraordinary Magnetic Curves for September, October and December 1841.

2. From the Magnetic Observatory at Singapore:—

Magnetic Observations from March to October, 1841, with Curves for the same period.

Anemometer Curves for March, April, May, June, July, August, September and October 1841.

Abstracts of the Weather for June, July, August and September 1841; as also the Determination of the Temperature at Singapore.

Tide Reports for April, May and June 1841.

3. From the Magnetic Observatory at Simla:—

Abstracts of Magnetic and Meteorological Observations for November and December 1841.

Magnetic Observations for February, May, October and December 1841, with Curves for the same period.

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April 28, 1842.

FRANCIS BAILY, Esq., V.P., in the Chair.

A paper, entitled, "On the Organic Tissues in the bony structure of the Corallidæ." By J. S. Bowerbank, Esq., F.G.S., communicated by Thomas Bell, Esq. F.R.S., was resumed and concluded.

The author submitted small portions of nearly seventy species of bony corals to the action of diluted nitric acid, and thus obtained their animal tissue, freed from calcareous matter, and floating on the surface of the fluid in the form of a delicate flocculent mass. By the aid of the microscope, this mass was found to be pervaded by a complex reticulated vascular tissue, presenting numerous ramifications and anastomoses, with lateral branches terminating in closed extremities. There were also found, interspersed among these, another set of tubes, of larger diameter than the former, and provided, in many places, with valves; the branches from these larger vessels occasionally terminate in ovoid bodies, having the appearance of gemmules or incipient polypes. In other cases, masses of still larger size, of a more spherical shape, and of a brown colour, were observed attached to the membrane, and connected with each other by a beautiful network of moniliform fibres. Numerous siliceous spicula, pointed at both extremities and exceedingly minute, were discovered in the membranous structure of several corals; and also other spicula of larger size, terminated at one extremity in a point, and at the other in a spherical head; a form bearing a striking resemblance to that of a common brass pin.

Besides these spicula, the author noticed in these membranous tissues a vast number of minute bodies, which he regards as identical with the nuclei of Mr. Robert Brown, or the cytoblasts of Schleiden.

A paper was also in part read, entitled, "Sixth Letter on Voltaic Combinations," addressed to Michael Faraday, Esq., D.C.L., F.R.S., &c. By John F. Daniell, Esq., For. Sec. R.S., Professor of Chemistry in King's College, London, &c.

May 5, 1842.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

Henry Frederic Link, Dr. G. S. Ohm, Jean Victor Poncelet, and Henry Rose, were severally elected Foreign Members of the Society.

George Hunsley Fielding, M.D., and John Jesse, Esq., were balloted for and duly elected into the Society.

The reading of a paper, entitled, "Sixth Letter on Voltaic Combinations," addressed to Michael Faraday, Esq., D.C.L., F.R.S., Fullerian Professor of Chemistry in the Royal Institution of Great Britain, &c., by John Frederic Daniell, Esq., Foreign Sec. R.S., Professor of Chemistry in King's College, London, was resumed and concluded.

The purport of this letter is to follow the consequences of the law of Ohm, and the expressions which result from it, relative to the electromotive force, and to the resistances in the course of a voltaic circuit; to apply this theory to the verification of the conclusions which the author had formerly deduced from his experiments; and to suggest additional experiments tending to remove some obscurities and ambiguities which existed in his former communications. In following out these principles, the author is led to offer various practical remarks on the different forms of voltaic batteries which have been proposed with a view either to the advancement of our theoretical knowledge of the science, or to the service of the arts. The author enters more particularly into an explanation of the principles on which the cylindric arrangement of the battery he has introduced is founded, which appear to him to have been greatly misunderstood. The formulæ and the calculations which form the body of this paper are not of a nature to admit of being reported in the present abstract.

A paper was also read, entitled, "On Fibre:" additional observations. By Martin Barry, M.D., F.R.S., Lond. and Ed.

On examining coagulating blood, the author finds that it contains discs of two different kinds; the one comparatively pale; the other, very red. It is in the latter discs that a filament is formed; and it is these discs which enter into the formation of the clot; the former, or the pale discs, being merely entangled in the clot, or else remaining in the serum. He thinks that the filament escaped the notice of former observers, from their having directed their attention almost exclusively to the undeveloped discs which remained in the serum, and thus conceived that the blood-discs are of subordinate importance, and are not concerned in the evolution of fibrin.

To render the filament distinctly visible, Dr. Barry adds a chemical reagent capable of removing a portion of the red colouring matter, without altogether dissolving the filament. He employs for



this purpose chiefly a solution of one part of nitrate of silver in 120 parts of distilled water; and sometimes also the chromic acid. He admits that the use of these reagents would, on account of their destructive tendency when concentrated, be objectionable as proofs of the absence of any visible structure; but as the point to be proved is that a certain specific structure does exist, he contends that the same appearance would not equally result from the chemical actions of reagents so different as are those of chrome and the salts of mercury and of silver. After the appearance of the filament, thus brought to light, has become familiar to the eye, it may be discerned in the blood-discs, when coagulation has commenced, without any addition whatever. Those blood-discs of the newt, which contain filaments, often assume the form of flask-like vesicles, the membranes of which exhibit folds, converging towards the neck, where, on careful examination, a minute body may be seen protruding. This body is the extremity of the filament in question, its protrusion being occasionally such as admit of its remarkable structure being recognised.

The author proceeds to describe various appearances which he has observed in the coagulum of the blood, and which strongly resemble those met with in the tissues of the body, and are obviously referable to a similar process of formation. He bears testimony to the accuracy of the delineations of coagulated blood given by Mr. Gulliver. One of the most remarkable phenomena discovered by the author in the coagulation of the blood is the evolution of red colouring matter; a change corresponding to that which he had previously observed to take place in the formation of the various structures of the body out of the corpuscles of the blood. He considers the production of filaments as constituting the essential circumstance in coagulation.

He conjectures that the notched or granulated fibres noticed in the blood by Professor Mayer, may have been of the same kind as the flat, grooved, and compound filaments described by himself; but he thinks that, in that case, Mayer's explanation of their mode of origin must be erroneous; for they may be seen to be produced by a portion of the blood not mentioned by him, namely, the corpuscles.

Mr. Addison's discovery of globules in the uppermost stratum of inflammatory blood, and of their influence in the formation of the buffy coat, is confirmed by Dr. Barry, who remarks that these globules are altered red blood-discs. That the blood corpuscles are reproduced by means of parent-cells, as suggested by Mr. Owen and by the author, is confirmed by the observations of Dr. Remak; but the author had long ago indicated a division of the nucleus as being more particularly the mode of reproduction, not only of those corpuscles, but of cells in general. With this conjecture the observations of Remak on the blood-corpuscles of the foetal chick fully accord. Whether the author's further speculation, namely, that the parent-cells are altered red blood-discs, is correct, still remains to be seen.

The phenomenon of the "breaking off short," or notching of the fasciculus of a voluntary muscle in a transverse cleavage of the fibre, is regarded by Dr. Barry as a natural consequence of the interlacing of the larger spirals, which he has described in a former paper; the fracture, in proceeding directly across the fasciculus, taking the direction in which there is least resistance.

The position of the filament in the blood-corpuscle is represented as bearing a striking resemblance to that of the young in the ovum of certain intestinal worms, the filaments of which are reproduced by spontaneous division. The author subjoins the following quære, "Is the blood-corpuscle to be regarded as an ovum?"

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May 12, 1842.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

The following papers were read, viz.—

1. "Barometrical Observations, showing the effect of the Direction of the Wind on the Difference between distant Barometers." By Lieut.-Colonel Philip Yorke, S. F. Guards. Communicated by Lieut.-Colonel Sabine, R.A., F.R.S., &c.

The author institutes a comparison between the barometric heights as observed at the Apartments of the Royal Society, and at his house in Herefordshire, in the neighbourhood of Ross, with a view to ascertain the influence of prevailing winds on the atmospheric pressure. The barometers thus compared together were of the same construction, and by the same maker; and the times of observation, namely nine o'clock A.M. and three o'clock P.M., were the same at both places, the distance between which is 110 miles in longitude, and about 20 in latitude. The degree of accordance in the march of the two barometers is exhibited by that of curves traced on three sheets accompanying the paper. The results are given in eight tables. The author agrees with Schubler in ascribing the currents prevailing in the atmosphere to the variable relations of heating and cooling which obtains between the Atlantic Ocean and the continent of Europe at different seasons; the facts ascertained by the series of observations here presented being in accordance with that hypothesis. If the northerly and westerly winds in England be partly the effect of the expansion of the air on the continent, then the barometer which is nearest to the continent, or in this instance that at London, ought to be relatively more depressed than the one more distant; or if the southerly and easterly winds be regarded as proceeding to the ocean, then, for a similar reason, the barometer nearest to the ocean ought to be relatively depressed; and that both these effects are produced, is shown by the tables. This view of the subject also, the author remarks, is corroborated by Raymond's observations, detailed in his memoir on the determination of the height of Clermont Ferrand, from which it appears that with the north winds, the



southern barometer was most depressed ; while the reverse occurred with the southerly winds.

"On the Rectification and Quadrature of the Spherical Ellipse." By James Booth, Esq., M.A., Principal of Bristol College. Communicated by John T. Graves, of the Inner Temple, Esq., M.A., F.R.S.

The author, at the commencement of this paper, adverts to a rather complex discussion of a portion of the subject of his inquiry by M. Catalan, published in the *Journal de Mathématiques*, edited by M. Lionville.

He then proceeds to establish two fundamental theorems, applicable to,—1st, the quadrature, and 2nd, the rectification of the spherical ellipse.

1st. The quadrature of the spherical ellipse is reduced to the calculation of a complete elliptic function of the third order, whose parameter and modulus are quantities essentially related to the cone ; its parameter being the square of the eccentricity of the ellipse, whose plane is at right angles to the axis of the cone, and its modulus being the sine of the semi-angle between the focals.

2nd. The rectification of the spherical ellipse is made to depend on a complete elliptic function of the third order, whose parameter is the same as in the preceding case, but whose modulus is the sine of the angle between the planes of the elliptic base and of one of the circular sections.

The author then proceeds to establish a remarkable relation between the area of a given spherical ellipse and the length of the spherical ellipse generated by the intersection of the supplemental cone with the same sphere.

He shows that if there are two concentric supplemental cones cut by the surface of a concentric sphere,—1st, the *sum* of their spherical bases, together with twice their lateral surfaces, is equal to the surface of the sphere ; 2nd, the *difference* of their spherical bases is equal to twice the difference of their lateral surfaces.

Hence, also, he deduces a remarkable theorem, viz. the sum of the spherical bases of any cone whose principal angles are supplemental, cut by a sphere, together with twice the lateral surface of the cone comprised within the sphere, is equal to the surface of the sphere.

The author then, alluding to some researches of Professor MacCullagh and of the Rev. Charles Graves, Fellow of Trinity College, Dublin, proceeds to give a simple elementary proof of a well-known formula of rectification, and thence deduces some remarkable properties of the tangent at that point of the ellipse, which is termed by him the point of *rational section*.

Assuming the properties of the plane ellipse, he proceeds to show that a similar formula of rectification holds for any curve generated by the intersection of a spherical surface with a concentric cone of any order. He goes on to develop a series of properties of the spherical ellipse, bearing a striking analogy, as indeed might have been expected, to those of the plane curve. Thus he establishes a

point of *rational section* as in the plane ellipse, shows that the tangent arc is at this point a *minimum*, and developes some other curious analogies. It is a simple consequence of his formula that the spherical elliptic quadrant may be divided into two arcs whose difference shall be represented by an arc of a great circle. This theorem, previously obtained by M. Catalan, is analogous to that of Fagnani, which shows that the difference of two plane elliptic arcs may be represented by a straight line.

The author concludes by reducing the quadrature of the surface of a cone of the second degree, bounded by a plane perpendicular to the axis, to the determination of a complete elliptic function of the second order.

The Society then adjourned over the Whitsun Recess, to meet again on the 26th instant.